REMARKS

In an Office Action dated November 14, 2002, the Examiner rejected claims 1-3, 5-6, 9-12 and 14-21 under 35 U.S.C. §103(a) as obvious over Cohen et al. (U.S. Patent 6,302,596) in view of McWilliams et al. (U.S. Patent 5,080,744); and rejected claims 4, 7-8 and 13 under 35 U.S.C. §103(a) as obvious over *Cohen* and *McWilliams*, further in view of Deman et al. (U.S. Patent 4,187,404).

Applicant respectfully traverses the Examiner's rejections herein.

Applicant's invention relates to the construction of optoelectronic modules. These are specific electronic devices having detailed design requirements. In particular, these devices form an interface between an optical fiber and a digital electronic device. In general, a lens is required to refract light and reduce attenuation at the interface, and an optoelectronic device (a transmitter or receiver) converts a signal from an electrical to an optical form (or vice-versa). Conventionally, these modules have been constructed by positioning an optoelectronic device adjacent a housing, finely adjusting the position so that the distance and orientation of the lens in relation to the optical device achieves minimum attenuation, and bonding the optoelectronic device to the housing where the two structures meet, i.e., along a rim or flange of the optoelectronic device, well away from the path of light. While this conventional technique has produced functioning devices, there are some problems associated with the cavity formed in the housing between the optoelectronic device and the lens, as explained in applicant's specification. Applicant's invention provides an improved design, whereby the cavity is essentially filled with an optically transmissive adhesive, preventing air and moisture from being in the cavity. Preferably, this requires re-design of the lens to accommodate the higher index of refraction of the adhesive.

Cohen discloses the major structural features of an optoelectronic module and optical subassembly as claimed by applicant, but does not disclose an adhesive interface between the lens and the optoelectronic device. In fact, although *Cohen* discloses the use of an adhesive, the adhesive is placed along the rim of the housing, far out of the path of light through the lens. Preferably, a two stage adhesive application is used, in which a tacking adhesive is applied during alignment, followed by a more permanent holding adhesive application. *Cohen* even describes in some detail various refinements to the rim of the housing which mates with a corresponding rim or flange of the TO can, so that maximum adhesive surface is presented and maximum bond is achieved.[1] Nowhere does *Cohen* even remotely suggest that adhesive be applied to fill the gap between the lens and the optoelectronic device. *Cohen*'s entire method of manufacture and attention to detail in the adhesive bonding surfaces is directed away from such an approach, and for these reasons, to the extent *Cohen* teaches anything, it teaches away from the application of an adhesive in the gap between the lens and the optoelectronic device.

McWilliams is cited by the Examiner as suggesting the use of an adhesive interface between the lens and the optoelectronic device. *McWilliams* discloses an optically transparent cover for a water meter. As explained in *McWilliams*, underground water meters are subject to high humidity conditions, and require covers which are both transparent (allowing them to be read) and impervious to moisture. Glass is an acceptable material, but for various reasons it is desirable to design plastic covers. Unfortunately, many otherwise suitable plastics, such as polycarbonate, do not provide a sufficient moisture barrier. *McWilliams* approaches this problem by forming a cover of two plastic layers bonded together with an adhesive, one layer providing structural strength and rigidity, while the other layer provides an effective moisture barrier.

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[1] See *Cohen*, col. 9, line 41 - col. 10, line 2.

Applicant submits that the proposed combination of references is not suggested by the art because, among other things, *McWilliams* is non-analogous art. There is nothing about *McWilliams* which relates to the problem of construction of optoelectonic modules. *McWilliams* is addressed to a single, narrow design problem only, i.e., the sealing of underground water meters from moisture. There is nothing in *McWilliams* that would suggest application of its techniques to the construction of optoelectronic modules, nor is there anything in *Cohen*, nor in optoelectronic module art in general, that would suggest to a practitioner in this field that he should look at the design and construction of underground water meters for solutions to design problems in the field of optoelectronic modules.

Even if one were to present *McWilliams* to a practitioner in the art of optoelectronc module design, *McWilliams* does not suggest applicant's claimed invention. *McWilliams* shows that you can bind two dissimilar plastic materials to provide a moisture barrier, but that hardly suggests applicant's adhesive interface between the optoelectronic module and the lens. The problem with conventional optoelectronic module design is that holes are created in the adhesive by the curing process, allowing moisture to enter. The housing and lens materials themselves are sufficiently moisture resistant, since the optoelectronic module is not subjected to the type of high moisture environment envisioned in *McWilliams*. *McWilliams* does not suggest how to deal with the problems of holes; it only suggest how to deal with a plastic cover of a material which is not sufficiently impervious to moisture. And specifically, *McWilliams* does not suggest filling a gap between a lens and an optoelectronic device with optically transmissive adhesive in order to keep air out of the cavity.

It is only by application of hindsight that one can see any connection at all between *McWilliams* and applicant's invention. But the connection, such as it is, is an extremely tenuous one. *McWilliams* shows only that you can bond two transparent members with a transparent layer of adhesive for form a transparent laminated structure. This is hardly new. Automotive safety

glass has been constructed in this fashion for years, as well as many other transparent structural members. None of these suggest applicant's specific contribution to the art of optoelectronic module design.

In various known examples of laminated transparent structures, lamination is performed to provide greater mechanical strength, greater resistance to shock, greater resistance to moisture penetration, or some other such property. Applicant applies an adhesive interface between two elements in order to fill a gap and prevent air and moisture from forming in the cavity. This is a specific solution to a specific design problem of optoelectronic modules, and it is not suggested by any general art in the field of laminated transparent structures.

The secondary reference, *Deman*, discloses use of an adhesive to couple an optical fiber to a lens, the adhesive having the same refractive index as the fiber. This choice of refractive index is presumably made to reduce reflection at the boundary between the adhesive and the fiber. Although is discloses an optically transmissive adhesive, it does not disclose or suggest other claimed aspects of applicant's invention, specifically, the use of the adhesive interface in the gap between the optoelectronic device and the lens.

For all of the reasons stated above, applicant's original claims are patentable over the cited art.

New claims 22-27 recite the same essential features as claim 1, in slightly narrower terms. Claim 22 specifically recites a housing forming a cavity, the adhesive filling a part of the cavity in the path of light between the optoelectronic device and the lens. For the reasons explained above, claim 22 and claims dependent on it are also patentable over the cited art.

In view of the foregoing, applicant submits that the application is now in condition for allowance and issue, and respectfully requests reconsideration and allowance of all claims. In addition, the Examiner is encouraged to contact applicant's attorney by telephone if there are outstanding issues left to be resolved to place this case in condition for allowance.

Respectfully submitted,

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